

**REMARKS**

With this Amendment, Applicant adds new claims 10-23. No new matter is added. Therefore claims 1-23 are all the claims currently pending in the present application.

**I. Formal Matters**

Applicant thanks the Examiner for acknowledging the claim to foreign priority and for confirming that the certified copy of the priority document was received.

Applicant thanks the Examiner for acknowledging receipt of the Information Disclosure Statement filed December 27, 2001 and for considering the references cited therein.

Applicant thanks the Examiner for indicating that the Formal Drawings filed December 27, 2001 are accepted.

**II. Rejection of Claims 1, 2, 4/1-2, 5-7, and 9/5-7 Under 35 U.S.C. § 102(b)**

Claims 1, 2, 4/1-2, 5-7, and 9/5-7 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Ito (U.S. Patent No. 5,210,415; hereinafter "Ito"). Applicant traverses this rejection and submits that Ito does not teach each and every element of claims 1, 2, 4/1-2, 5-7, and 9/5-7.

To be precise, Applicant submits that Ito fails to disclose, teach, or otherwise suggest *at least* a radiation image signal processing method, comprising, *inter alia*, performing second energy subtraction processing with respect to the low energy image signal and the high energy image signal, wherein the second energy subtraction processing is performed by the utilization of the *pair of the corrected original image signals, which have been obtained at the time of the first energy subtraction processing*, as required by claim 1. In the Office Action, the Examiner relies on column 9, lines 10-19, and column 10, lines 19-23 for the proposition that Ito discloses the

above-identified requirement of claim 1. Applicant submits that the Examiner has misconstrued the teachings of Ito and that neither the cited portion, nor any other portion of Ito discloses or suggests all of the features of claim 1.

Instead, Ito relates generally to a “method for forming an energy subtraction image wherein, when a beam hardening phenomenon occurs to different extents for different parts of an object, the adverse effects of the beam hardening phenomenon are minimized” so that a “subtraction image having good image quality” can be obtained. Col. 3, lines 30-35 & Col. 4, lines 61-66. The values of the parameters for subtraction image are changed “in accordance with the values of an image signal, which is generated from the plurality of radiation image signals and which represents the mean-level image of the plurality of the radiation images subjected to the subtraction process.” Col. 5, lines 15-24.

In order to generate the mean-level image, Ito teaches that “a smoothed image ... is formed.” Col. 8, lines 45-47. Ito describes that the smoothed image may be obtained by adding a first X-ray image 41 and a second X-ray image 42 to each other to form a superposition image signal SO. Mean values of the image signal components of the superposition image signal SO are calculated and a smoothed signal SSM is generated. Col. 8, lines 49-68; Col. 9, lines 1-7.

During a subtraction process, Ito teaches that a first image signal S01 (representing the first X-ray image 41) and a second image signal S02 (representing the second X-ray image 42) “are subtracted from each other.” Col. 9, lines 14-18. According to the Ito disclosure, a soft tissue image signal S1 is obtained during the subtraction process where the values of parameters (i.e.,  $K_a$ ,  $K_b$  and  $K_c$ ) used for subtraction are represented by functions where the smoothed image signal SSM serves as a variable. (See Fig. 4 of Ito & Col. 9, lines 22-52). Column 10,

lines 21-23 of Ito merely describes that “a bone image signal 44 [e.g. S2] may be generated by using functions [representing] parameters for a bone image.” (*See also* Fig. 3 of Ito).

In view of the preceding discussion, the Examiner’s reliance on column 9, lines 10-19 and column 10, lines 19-23 of Ito, does not teach the requirement for wherein the second energy subtraction processing is performed by the utilization of *the pair of the corrected original image signals, which have been obtained at the time of the first energy subtraction processing*, as claimed. In rejecting claim 1, the Examiner seems to suggest that column 9, lines 10-19 of Ito discloses the above-identified features of claim 1 since the cited portion of Ito describes that “the first image signal S01 and the second image signal S02 are weighted, and subtracted from each other which represent the image information stored at corresponding picture elements in the two X-ray images.” According to the Examiner, “this indicates the two position corrected original image signals have been stored for use in the subtraction process.” (*See* page 3 of the Office Action). Without citing to any particular column or line number, the Examiner alleges that Ito teaches the “two position corrected original image signals” “*would be saved in memory, ... and these saved [corrected] image signals would be available for both the first and second energy subtraction processes*” since position correcting processing is performed prior to a first energy subtraction process. (*See* page 3 of the Office Action) (emphasis added).

Even assuming *arguendo* that the soft tissue image signal S1 corresponds to a first energy subtraction process and that “two position corrected original image signals” have been stored and are used in the subtraction process to obtain the soft tissue image signal S1, (as suggested by the Examiner) there is no disclosure or teaching in Ito and the Examiner cites to none suggesting that the bone image signal S2, is generated by utilizing “two position corrected original image

signals” obtained at the time when the soft tissue image signal S1 was generated. At best, Ito merely describes that the bone image signal S2 “may be generated by using functions.” Col. 10, lines 19-23. Nowhere in Ito is there any disclosure or suggestion that “two position corrected original image signals” obtained at the time when the soft tissue image signal S1 was generated are used in a subtraction process to generate the bone image signal S2. Ito therefore does not disclose or suggest that the same pair of corrected image signals is used for a first energy subtraction process and a second energy subtraction process. Accordingly, Ito does not expressly disclose, teach or otherwise suggest the requirement for wherein the second energy subtraction processing is performed by the utilization of the pair of the corrected original image signals, *which have been obtained at the time of the first energy subtraction processing*, as required by claim 1.

Additionally, Applicant submits that Ito does not inherently teach that the bone image signal S2 is generated by utilizing “two position corrected original image signals” obtained at the time that the soft tissue image signal S1 is generated. As described on page 6 at lines 12-18 of the specification, the bone image signal S2 could have been generated by utilizing a different pair of corrected image signals, obtained immediately preceding a second energy subtraction process, according to the conventional technique for performing energy subtraction processing. Therefore, any arguments by the Examiner which rely on inherent disclosure of a second energy subtraction process utilizing a pair of corrected original image signals, which have been obtained at the time of the first energy subtraction processing is not sufficient to support an anticipation rejection because there are alternative ways in which a person skilled in the art could utilize a

pair of corrected image signals to perform a second energy subtraction process which do not require the features described by claim 1.

Since there is no express disclosure in Ito suggesting a radiation image signal processing method, comprising, *inter alia*, performing second energy subtraction processing with respect to the low energy image signal and the high energy image signal, wherein the second energy subtraction processing is performed by the utilization of the *pair of the corrected original image signals, which have been obtained at the time of the first energy subtraction processing* and given that this feature is not inherently disclosed by Ito, Ito cannot be said to anticipate claim 1 within the meaning of 35 U.S.C. § 102. Ito does not contain any teaching or suggestion of such a feature, either, and therefore Applicant respectfully submits that Ito could not be said to render the subject matter of claim 1 obvious within the meaning of 35 U.S.C. § 103. Applicant therefore respectfully requests the Examiner to reconsider and withdraw the § 102(b) rejection of claim 1.

Regarding claims 2, 3, 4/1, 4/2, and 4/3, which depend from claim 1, Applicant submits that claims 2, 3, 4/1, 4/2, and 4/3 are patentable for at least the reasons submitted for claim 1.

Since claim 5 contains features similar to the features recited in claim 1, Applicant submits that claim 5 is independently patentable for reasons analogous to those submitted for claim 1. To be precise, Ito fails to expressly or inherently disclose at least a radiation image signal processing apparatus wherein, second energy subtraction processing is performed with respect to the low energy image signal and the high energy image signal, the second energy subtraction processing being performed by the utilization of the pair of the corrected original

image signals, which have been obtained at the time of the first energy subtraction processing, as required by claim 5.

Concerning claims 6-8, 9/5, 9/6, 9/7 and 9/8 which depend from claim 5, Applicant submits that claims 6-8, 9/5, 9/6, 9/7 and 9/8 are patentable for at least the reasons submitted for claim 5.

With further regard to claim 6, Applicant submits that claim 6 recites independently patentable subject matter because Ito fails to disclose, suggest or otherwise teach a radiation image signal processing apparatus, wherein the apparatus comprises, *inter alia*, storage means for storing the pair of the corrected original image signals, *which have been obtained at the time of the first energy subtraction process*, and control means for controlling the common energy subtraction processing means in accordance with the instruction, which has been outputted from the instruction means, such that the common energy subtraction processing means *performs the second energy subtraction processing by the utilization of the pair of the corrected original image signals, which have been stored in the storage means*. In rejecting claim 6, the Examiner seems to posit that Ito inherently teaches the above-identified requirement of claim 6. Applicant submits that evidence of inherency in a reference “must make it clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.” (See MPEP § 2112) (emphasis added). The mere “fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic.” (See *id.*) (emphasis added).

Here, the Examiner has not provided the basis in fact or technical reasoning to reasonably support the determination that Ito inherently teaches a control means for controlling the common

energy subtraction processing means in accordance with the instruction means, such that the common energy subtraction processing means performs the second energy subtraction processing *by the utilization of the pair of the corrected original image signals, which have been stored in the storage means*, as claimed. To be precise, the Examiner's assertion that "it would be inherent that the computer would have instructions for performing the second energy subtraction process stored in memory with the CPU controlling the common energy subtraction processing" does not demonstrate that the features recited in claim 6 are necessarily present in the Ito disclosure. Even assuming *arguendo* that a CPU constitutes a control means, the CPU may control the common energy subtraction processing means which performs a second energy subtraction processing by utilizing a different pair of corrected image signals, which are stored in a storage means and obtained immediately preceding the second energy subtraction process according to the conventional energy subtraction processing technique discussed above with respect to claim 1. Given this alternative utilization of a pair of corrected image signals for performing second energy subtraction processing, the features of claim 6 do not necessarily flow from the teachings of the Ito disclosure. There is no express disclosure in Ito teaching the above-identified features of claim 6 either.

Accordingly, Applicant submits that Ito does not expressly or inherently teach a control means for controlling the common energy subtraction processing means in accordance with the instruction, which has been outputted from the instruction means, such that the common energy subtraction processing means performs the second energy subtraction processing by the utilization of the pair of the corrected original image signals, *which have been stored in the storage means and which have been obtained at the time of the first energy subtraction*

*processing*, as required by claim 6. For this additional reason, Applicant respectfully requests the Examiner to reconsider and withdraw the § 102(b) rejection of claim 6.

**III. Rejection of Claims 3, 4/3, 8, and 9/8 Under 35 U.S.C. § 103(a) over Ito in view of Huang**

The Examiner rejected claims 3, 4/3, 8, and 9/8 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Ito in view of Huang (**H.K. Huang, D.Sc., PACS: Basic Principles and Applications**, pgs. 178-179, (1999); hereinafter “Huang”). Applicant respectfully traverses this rejection for the following reasons.

Applicant submits that claims 3 and 4/3 are patentable for *at least* the reasons submitted for independent claim 1 and because Huang fails to make up for the deficiencies of Ito.

Regarding claim 8, Applicant submits that claim 8 is patentable for *at least* the reasons submitted for independent claim 5 and because Huang fails to make up for the deficiencies of Ito.

With further regard to claim 8, Applicant submits that claim 8 recites independently patentable subject matter because Ito, Huang, or a combination thereof fails to teach, suggest or provide motivation for a radiation image signal processing apparatus wherein the apparatus comprises, *inter alia*, second energy subtraction processing means for performing the second energy subtraction processing, and control means for transferring the pair of the corrected original image signals, which have been obtained at the time of the first energy subtraction processing, *to the second energy subtraction processing means*, and *controlling the second energy subtraction processing means in accordance with the instruction*, which has been outputted from the instruction means, *such that the second energy subtraction processing means*



*performs the second energy subtraction processing by the utilization of the pair of the corrected image signals*, which have thus been transferred, as required by claim 8. In rejecting claim 8, the Examiner correctly concedes that Ito fails to teach a “control means for transferring the pair of [the] corrected original image signals.” (See page 7 of the Office Action). However, the Examiner seems to allege that Huang makes up for the deficiencies of Ito and that the combination of Ito and Huang teaches all of the features of claim 8. Contrary to the Examiner’s assertion, there simply is no disclosure in Ito and Huang suggesting all of the features of claim 8.

Huang fails to make up for the deficient teachings of Ito and Applicant submits that Huang does not teach or suggest the features of claim 8. Huang merely relates generally to a picture archiving and communication system (PACS) in which imaging examinations are sent from an acquisition gateway computer to a PACS controller consisting of high end computers or servers capable of performing various operations. (See pages 178-179 of Huang). Nowhere in Huang is there any disclosure suggesting a second energy subtraction processing means for performing the second energy subtraction processing, as required by claim 8.

Since neither Ito, Huang nor any combination thereof teaches, suggests or provide motivation for all of the limitations of claim 8, the Examiner’s § 103(a) rejection of claim 8 should be reconsidered and withdrawn for *at least* the reasons discussed above.

Applicant respectfully submits that the Examiner has not provided motivation known in the art to combine Ito with Huang in the way the Examiner contends. More particularly, Huang does not mention that the PACS controller is capable of transferring energy subtraction image signals to a server. The Huang disclosure also does not mention that the PACS controller is capable of performing an energy subtraction process. The Examiner combined the two applied

references only after benefiting from the advantage of knowledge of the present specification which constitutes impermissible hindsight reconstruction according to *In re Vaeck*, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). (*See also* MPEP § 2143). Applicant therefore respectfully submits that the Examiner's rationale to combine Ito with Huang is deficient and the § 103(a) rejection of claim 8 should be reconsidered and withdrawn for this additional reason.

With respect to claim 9/8, Applicant submits that claim 9/8 is patentable for *at least* the reasons submitted for claims 5 and 8 and because Huang fails to make up for the deficiencies of Ito.

#### **IV. New Claims**

Applicant has added new claims 10-23 in order to more fully cover various aspects of Applicant's invention as disclosed in the specification. In addition to their dependencies from claims 1 and 5, Applicant respectfully submits that claims 10-23 should be allowable because the cited prior art does not teach or suggest the limitations of these claims.

#### **V. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


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